

## Trend Study 16C-26-04

Study site name: Dry Mountain.

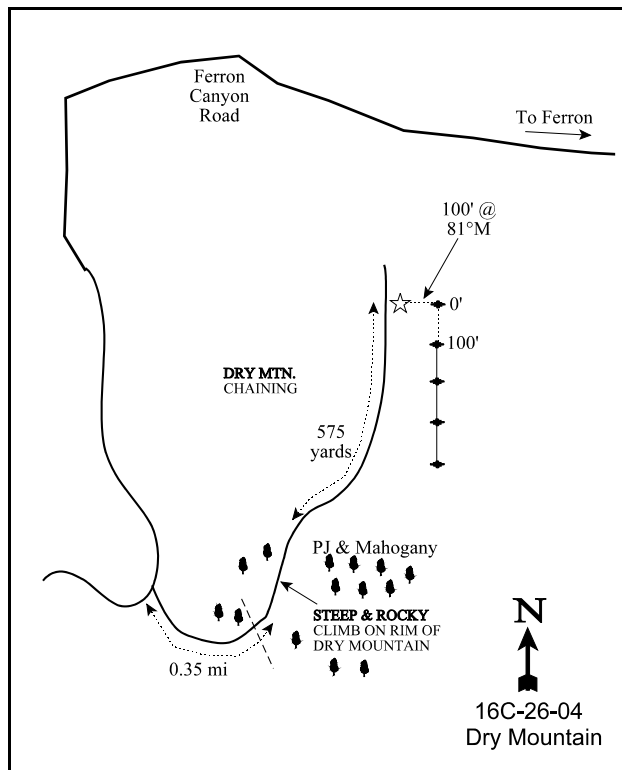
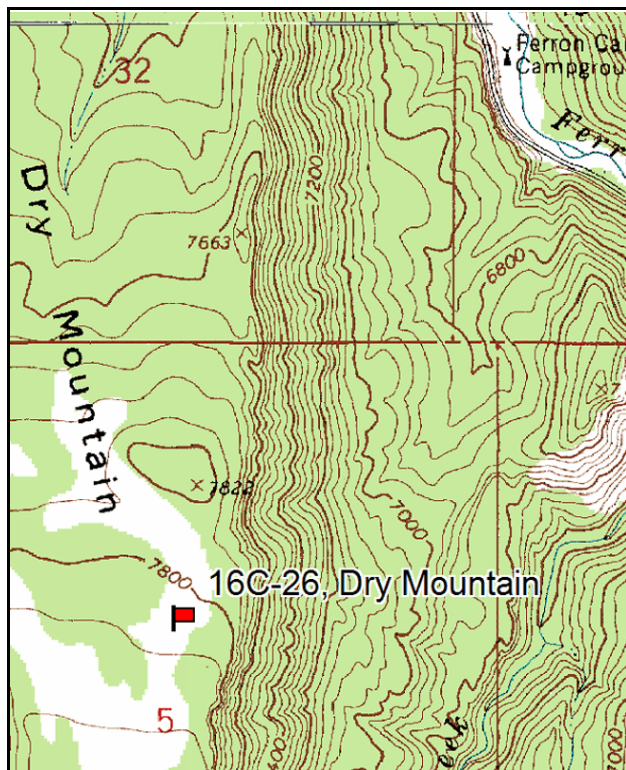
Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

### LOCATION DESCRIPTION

From the junction of Highway U-10 and Canyon Road in Ferron, proceed west up Ferron Canyon toward Ferron Reservoir for 12.85 miles. At this point, bear left (SE) and go 0.35 mile to the base of Dry Mountain, where the road becomes impassably steep and rocky. From the top of this steep section, hike north down the road approximately 575 yards to a witness post on the right side of the road. From the witness post walk east at  $81^{\circ}$  M about 100 feet to the 0-foot baseline stake. The study stakes are short green fenceposts.



Map Name: Flagstaff Peak.

Diagrammatic Sketch

Township 20S, Range 6E, Section 5

GPS: NAD 27, UTM 12S 4328949 N, 476649 E

## DISCUSSION

### Dry Mountain - Trend Study No. 16C-26

The Dry Mountain study site is on the north-facing Dry Mountain plateau which provides excellent winter range for deer and elk in mild to normal winters. The plateau was chained and seeded in 1967 and now supports a vigorous stand of mountain big sagebrush and antelope bitterbrush. Along the edges are mature pinyon-juniper and curlleaf mountain mahogany populations. The trend site has a gentle 5% slope and a north aspect. The whole plateau slopes to the north, and ends in high cliffs above Ferron Creek. The only access is on the south end. Elevation is 7,850 feet. Deer pellet groups are abundant while elk sign is scarce. There is little cattle sign on this part of the Ferron grazing allotment. Summer cattle use is restricted by the lack of water and access to the plateau. Pellet group data from 1999 estimate 72 deer, 1 elk and 2 cow days use/acre (178 ddu/ha, 3 edu/ha, and 5 cdu/ha). About 90% of the deer pellet groups encountered were from the previous winter and the remainder from this spring. Rabbit pellets are very abundant. Pellet group data from 2004 estimate 110 deer and 3 cow days use /acre (271 ddu/ha and 7 cdu/ha). Cow pats were old and most of the deer pellets were from the previous winter.

The soil is very sandy and moderately deep, but sandstone bedrock is found at an average depth of 14 inches. There are scattered sandstone rock outcrops near the 0 ft stake. The soil has a loamy sand texture with a neutral to slightly alkaline pH (7.3). Phosphorus and potassium are limited at 2.9 and 41.6 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium can limit normal plant growth and development. Erosion is slight due to good vegetative, litter cover, and lack of significant slope. There are few rocks or pavement on the surface.

Both mountain big sagebrush and antelope bitterbrush are abundant on the site and provide valuable forage. Mountain big sagebrush is the most abundant shrub with a density of 7,199 plants/acre in 1988, 3,840 in 1994, 3,940 in 1999, and 3,640 in 2004. Most of the differences in population density between 1988 and 1994 is due to the much larger sample taken beginning in 1994, but some of the change is due to the lack of young plants being sampled in 1994. Seedlings and young sagebrush were numerous in 1988 due to the wet years in the mid 1980's. Most of these plants did not survive the drought years that followed causing a large decline in population densities. The number of mature sagebrush on the site have decreased slightly from the previous years (3,000 plants/acre in 1988 to 2,260 in 2004). The mature plants show moderate to heavy use and good vigor. The percent of decadent plants in 1999 was 22% of the population and has increased to 33% in 2004. The proportion of decadent plants that are classified as dying increased from 20% in 1999 to 35% in 2004. Recruitment of young into the population continues to be low.

The highly palatable antelope bitterbrush is moderately abundant and produces 23% of the browse cover in 1999 and 16% in 2004. It displayed moderate use in 1988 and 1994, with more heavy utilization in 1999 and 2004. Estimated density was 1,500 plants/acre in 1994, increasing slightly to 1,720 by 1999, and declining to 1,300 in 2004. Those classified with poor vigor has increased to 18%. Percent decadence has increased from 9% in 1999 to 48% in 2004. Rabbitbrush is also present and exhibits a mostly mature population. Juniper and pinyon tree density in 1994 was estimated at 52 and 25 trees/acre according to point-center quarter data. In 1999, many pinyon and juniper trees were thinned-out by hand as a chaining maintenance treatment. Point quarter data estimates surviving trees at 9 trees/acre for juniper and 13 for pinyon. Average diameter of juniper is 6.6 inches while that of pinyon is 2.2 inches.

The understory is diverse but not very abundant due to the dominance of shrubs. The most abundant grass species include, western wheatgrass, blue grama, and needle-and-thread. Some use was seen on grass species. Eleven species of forbs were identified in 1994, 17 in 1999, and 16 in 2004. Combined cover for the forbs accounts for less than 1% cover in 1994, 3% in 1999, and 2% in 2004. Forbs are obviously a minor component for this sagebrush community.

## 1994 TREND ASSESSMENT

Soil trend is considered stable because relative cover for bare soil only increased by only one percent. There are minimal signs of erosion basically because vegetative cover comes almost entirely from browse. Although the overall mountain big sagebrush population has decreased, the mature population is apparently stable. However, most of the decrease is due to high numbers of young plants sampled in 1988 and the much larger sample size used in 1994 which gives improved estimates for shrub species. The rate of decadency is moderately high and there is reduced vigor on the decadent plants. Mature antelope bitterbrush have increased in density but the population shows increased decadency (13% to 23%). This is still low for a bitterbrush stand. Overall browse trend is stable. There is a poor composition of forbs and they offer very little forage. Grasses dominant the herbaceous understory. Sum of nested frequency of perennial grasses has remained stable while the sum of nested frequency for perennial forbs has declined. Overall the herbaceous understory trend is stable for the perennial forb component contributes to only three tenths of one percent total cover. The Desirable Components Index (see methods) rated this site as poor with a score of 47 due to high decadence, few young shrubs, and low grass and forb cover.

### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

winter range condition (DC Index) - 47 (poor) Mountain big sagebrush type - chaining

## 1999 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1994. Trend for browse is up slightly for the key species, mountain big sagebrush and antelope bitterbrush. Mountain big sagebrush displays a stable population with mostly moderate use, improved vigor, and reduced decadence. Bitterbrush shows more heavy use, but improved recruitment and reduced decadence. Trend for the herbaceous understory is mixed. Sum of nested frequency of perennial grasses has declined slightly, while nested frequency of perennial forbs has increased dramatically and where they provide one-third of the herbaceous cover. Overall trend for the herbaceous understory is considered stable. The Desirable Components Index rated this site as fair with a score of 59 due to slightly decrease in decadence, an increase in young shrubs, and an increase in forb cover.

### TREND ASSESSMENT

soil - stable (3)

browse - up slightly (4)

herbaceous understory - stable (3)

winter range condition (DC Index) - 59 (fair) Mountain big sagebrush type - chaining

## 2004 TREND ASSESSMENT

Trend for soils is stable with similar protective cover characteristics compared to 1999. Trend for mountain big sagebrush and antelope bitterbrush is down slightly. Mountain big sagebrush decadency increased from 22% in 1999, to 33% in 2004. Although this value is similar to that estimated in 1988 and 1994. Utilization increased and is moderate to heavy. Young recruitment is low and is not compensating for dying plants. Bitterbrush shows heavy use and 48% of the bitterbrush plants are decadent. Young recruitment is not producing enough to compensate for the dying plants. Trend for herbaceous understory is slightly down. Needle-and-thread grass has significantly declined in nested frequency, which was previously one of the most abundant grasses. Forbs are diverse but provide less than 1% cover on the site and have decreased in nested frequency. The Desirable Components Index rated this site as poor with a score of 44 due to high decadence,

few young shrubs, and continued low grass and forb cover.

# TREND ASSESSMENT

soil - stable (3)

browse - down slightly (2)

herbaceous understory - down slightly (2)

winter range condition (DC Index) - 44 (poor) Mountain big sagebrush type - chaining

## HERBACEOUS TRENDS --

Management unit 16C, Study no: 26

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
G	Agropyron intermedium	-	-	-	4	-	-	.03
G	Agropyron smithii	<sub>b</sub> 105	<sub>b</sub> 98	<sub>ab</sub> 68	<sub>a</sub> 42	.35	.40	.47
G	Bouteloua gracilis	64	47	42	34	1.86	1.60	1.16
G	Carex spp.	1	4	4	-	.03	.15	.03
G	Elymus salina	-	-	3	5	-	.03	.37
G	Oryzopsis hymenoides	<sub>a</sub> 6	<sub>b</sub> 26	<sub>ab</sub> 16	<sub>ab</sub> 15	.69	.43	.29
G	Poa fendleriana	12	15	10	7	.05	.02	.18
G	Sitanion hystrix	<sub>a</sub> -	<sub>b</sub> 11	<sub>ab</sub> 6	<sub>b</sub> 9	.02	.02	.08
G	Sporobolus cryptandrus	3	3	2	5	.00	.15	.06
G	Stipa comata	<sub>c</sub> 117	<sub>bc</sub> 97	<sub>b</sub> 75	<sub>a</sub> 19	1.76	1.34	.52
G	Stipa lettermani	-	-	6	-	-	.18	.03
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		308	301	232	140	4.78	4.34	3.24
Total for Grasses		308	301	232	140	4.78	4.34	3.24
F	Androsace septentrionalis (a)	-	<sub>a</sub> -	<sub>b</sub> 14	<sub>a</sub> -	-	.06	-
F	Antennaria spp.	2	-	-	-	-	-	-
F	Arabis spp.	<sub>b</sub> 23	<sub>a</sub> 3	<sub>b</sub> 22	<sub>ab</sub> 9	.01	.05	.03
F	Arabis perennans	<sub>b</sub> 13	<sub>a</sub> 1	<sub>a</sub> -	<sub>a</sub> -	.00	-	-
F	Astragalus convallarius	2	-	-	2	-	-	.03
F	Aster spp.	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 30	<sub>a</sub> -	-	.17	-
F	Astragalus spp.	-	1	4	2	.00	.03	.03
F	Chaenactis douglasii	<sub>ab</sub> 12	<sub>ab</sub> 3	<sub>b</sub> 16	<sub>a</sub> 3	.01	.08	.00
F	Chenopodium spp. (a)	-	-	-	3	-	-	.00
F	Crepis acuminata	4	-	1	-	-	.00	-
F	Cryptantha spp.	<sub>a</sub> -	<sub>ab</sub> 15	<sub>b</sub> 27	<sub>a</sub> 7	.09	.72	.18
F	Descurainia pinnata (a)	-	-	1	3	-	.00	.00
F	Eriogonum cernuum (a)	-	-	-	2	-	-	.00
F	Erigeron pumilus	<sub>a</sub> 3	<sub>a</sub> -	<sub>b</sub> 15	<sub>ab</sub> 11	-	.14	.03

T y p e	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
F	Eriogonum racemosum	4	2	3	7	.01	.04	.09
F	Gaillardia pinnatifida	-	1	-	-	.00	-	-
F	Gayophytum ramosissimum(a)	-	2	-	3	.00	-	.01
F	Heterotheca villosa	-	-	-	1	-	-	.03
F	Ipomopsis aggregata	-	-	1	-	-	.00	-
F	Lygodesmia spp.	-	1	3	-	.03	.15	-
F	Machaeranthera canescens	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 11	<sub>ab</sub> 1	-	.08	.01
F	Oenothera spp.	3	-	1	-	-	.00	-
F	Polygonum douglasii (a)	-	3	-	-	.00	-	-
F	Schoenocrambe linifolia	22	23	12	10	.08	.03	.07
F	Senecio multilobatus	<sub>a</sub> 36	<sub>a</sub> 10	<sub>b</sub> 118	<sub>a</sub> 36	.06	1.24	.33
F	Trifolium spp.	-	-	2	1	-	.01	.00
Total for Annual Forbs		0	5	15	11	0.00	0.07	0.02
Total for Perennial Forbs		124	60	266	90	0.31	2.77	0.86
Total for Forbs		124	65	281	101	0.31	2.84	0.88

Values with different subscript letters are significantly different at alpha = 0.10

#### BROWSE TRENDS --

Management unit 16C, Study no: 26

T y p e	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Artemisia tridentata vaseyana	88	86	88	19.94	21.67	22.86
B	Chrysothamnus viscidiflorus viscidiflorus	53	55	56	1.53	2.07	2.45
B	Echinocereus triglochidatus	0	4	1	-	-	-
B	Gutierrezia sarothrae	7	8	9	.00	.02	.21
B	Juniperus osteosperma	15	13	0	.66	-	-
B	Leptodactylon pungens	19	18	16	.13	.25	.78
B	Opuntia spp.	5	9	11	-	.05	.18
B	Pinus edulis	0	3	1	.44	.18	-
B	Purshia tridentata	43	51	46	5.56	7.15	4.94
Total for Browse		230	247	228	28.28	31.39	31.43

CANOPY COVER, LINE INTERCEPT --  
Management unit 16C, Study no: 26

Species	Percent Cover '04
<i>Artemisia tridentata vaseyana</i>	25.98
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	3.90
<i>Gutierrezia sarothrae</i>	.26
<i>Leptodactylon pungens</i>	.33
<i>Purshia tridentata</i>	6.93

KEY BROWSE ANNUAL LEADER GROWTH --  
Management unit 16C, Study no: 26

Species	Average leader growth (in) '04
<i>Artemisia tridentata vaseyana</i>	1.6
<i>Purshia tridentata</i>	3.6

POINT-QUARTER TREE DATA --  
Management unit 16C, Study no: 26

Species	Trees per Acre		Average diameter (in) '99
	'94	'99	
<i>Juniperus osteosperma</i>	52	9	6.6
<i>Pinus edulis</i>	25	13	2.2

BASIC COVER --  
Management unit 16C, Study no: 26

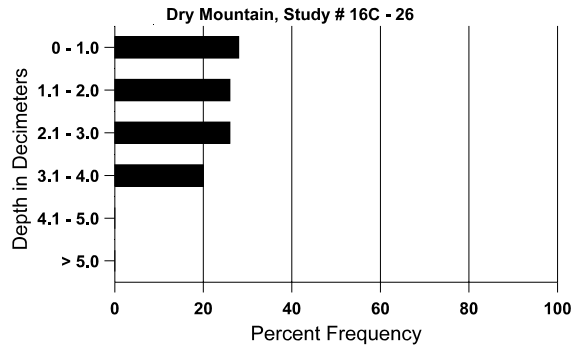
Cover Type	Average Cover %			
	'88	'94	'99	'04
Vegetation	5.75	37.89	34.27	36.88
Rock	2.25	2.88	3.32	3.91
Pavement	.25	.52	.63	.79
Litter	69.50	46.47	49.09	54.00
Cryptogams	2.50	3.01	2.12	2.16
Bare Ground	19.75	24.49	26.34	22.61

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 26, Study Name: Dry Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	% OM	PPM P	PPM K	ds/m
14.0	54.3 (16.4)	n/a	83.6	5.8	10.6	1.0	2.9	41.6	0.7

## Stoniness Index



PELLET GROUP DATA --

Management unit 16C, Study no: 26

Type	Quadrat Frequency			Days use per acre (ha)	
	'94	'99	'04	'99	'04
Rabbit	21	42	13	-	-
Elk	2	-	-	1 (3)	-
Deer	64	34	38	72 (178)	110 (271)
Cattle	-	-	-	2 (5)	3 (7)

BROWSE CHARACTERISTICS --

Management unit 16C, Study no: 26

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<b>Artemisia tridentata vaseyana</b>												
88	<b>7199</b>	1000	1933	3000	2266	-	61	7	31	.55	2	19/29
94	<b>3840</b>	20	80	2440	1320	380	42	8	34	21	21	20/36
99	<b>3940</b>	20	200	2880	860	700	53	10	22	4	5	23/36
04	<b>3640</b>	100	80	2360	1200	280	66	19	33	12	12	20/36
<b>Chrysothamnus viscidiflorus viscidiflorus</b>												
88	<b>5066</b>	133	1266	3600	200	-	1	1	4	-	0	8/9
94	<b>1960</b>	-	-	1940	20	-	9	3	1	1	1	11/14
99	<b>2120</b>	160	340	1740	40	20	9	0	2	.94	.94	14/16
04	<b>2280</b>	20	40	1920	320	-	3	.87	14	3	4	13/17

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<b>Echinocereus triglochidatus</b>												
88	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
94	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
99	<b>80</b>	-	20	60	-	-	0	0	0	-	0	1/3
04	<b>80</b>	-	-	-	80	-	0	0	100	-	0	-/-
<b>Gutierrezia sarothrae</b>												
88	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
94	<b>360</b>	-	20	340	-	-	0	0	-	-	0	5/6
99	<b>400</b>	20	120	280	-	-	0	0	-	-	0	7/6
04	<b>580</b>	20	240	340	-	-	0	0	-	-	0	9/10
<b>Juniperus osteosperma</b>												
88	<b>66</b>	-	66	-	-	-	0	0	-	-	0	-/-
94	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
99	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
04	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<b>Leptodactylon pungens</b>												
88	<b>2465</b>	133	933	1466	66	-	0	0	3	-	0	5/5
94	<b>800</b>	-	-	800	-	-	0	0	0	-	0	6/6
99	<b>1040</b>	180	220	740	80	80	0	0	8	4	6	5/7
04	<b>720</b>	20	60	600	60	-	0	0	8	3	3	7/10
<b>Opuntia spp.</b>												
88	<b>200</b>	-	-	200	-	-	0	0	0	-	0	2/2
94	<b>120</b>	-	20	100	-	-	0	0	0	-	0	3/11
99	<b>280</b>	-	60	200	20	-	0	0	7	7	7	2/6
04	<b>340</b>	-	40	300	-	-	0	0	0	-	12	2/9
<b>Pinus edulis</b>												
88	<b>266</b>	133	266	-	-	-	0	0	-	-	0	-/-
94	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
99	<b>60</b>	-	60	-	-	100	0	0	-	-	33	-/-
04	<b>20</b>	20	20	-	-	-	0	100	-	-	0	-/-
<b>Purshia tridentata</b>												
88	<b>999</b>	66	266	600	133	-	67	0	13	-	0	14/28
94	<b>1500</b>	-	40	1120	340	100	51	7	23	5	5	15/40
99	<b>1720</b>	60	340	1220	160	240	12	23	9	1	1	19/39
04	<b>1300</b>	-	60	620	620	140	20	77	48	18	18	15/38